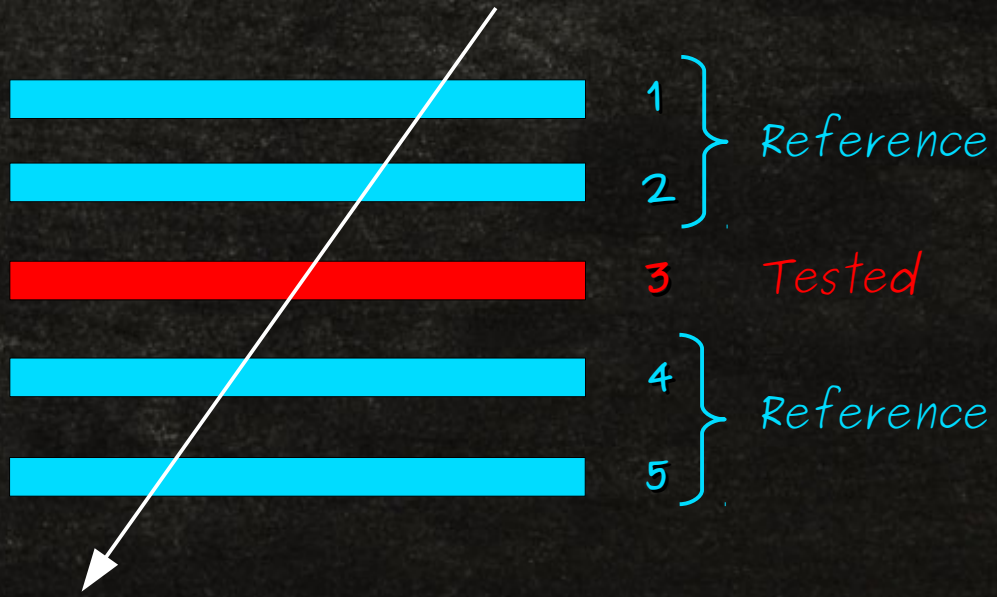
Muon Trigger Update

LArIAT Meeting
July 11th, 2013

Roberto Acciarri, Michelle Stancari, Jesus Rendon, Andrew Olivier, Flor Blaszczyk, Emily Dvorak, Jennifer Kindermann, Renee Gardner, Jieun Yoo, Ryan Linehan

From the last update...

- ✔ Test of BSU counters started!!!
- ✔ 10 counters tested for light leaks, efficiency and noise as a function of PMT voltage. For the first 6 the efficiency has been determined as a function of PMT voltage AND trigger position.



Efficiency

$$Eff = \frac{(1.\mathrm{AND}.2).\,AND.3.AND.\,(4.\mathrm{AND}.5)}{(1.\mathrm{AND}.2).\,AND.\,(4.\mathrm{AND}.5)}$$

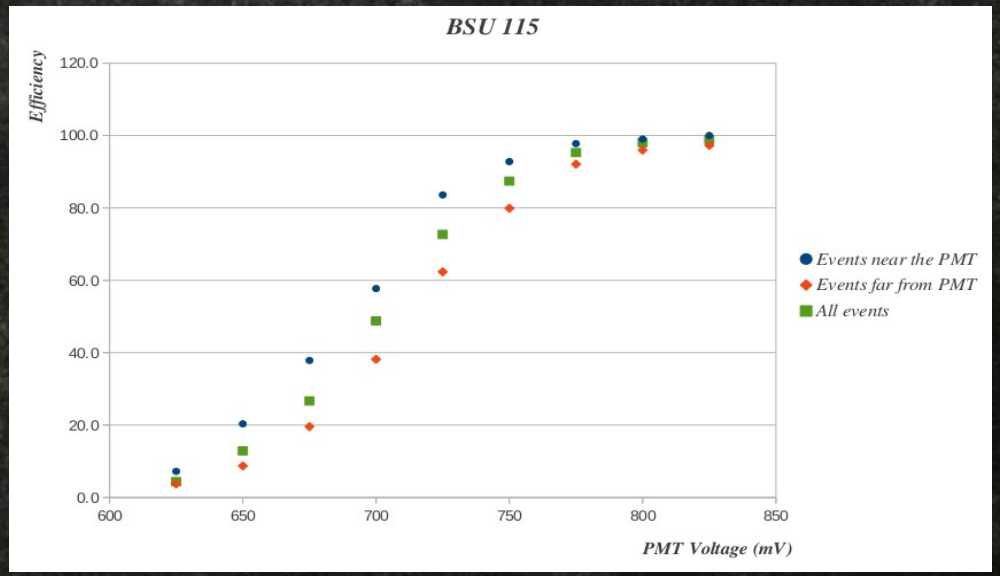
Noise

$$Noise = \frac{3-[3.\mathrm{AND}.[(1.\mathrm{AND}.2).\,OR.\,(4.\mathrm{AND}.5)]]}{3}$$

From the last update...

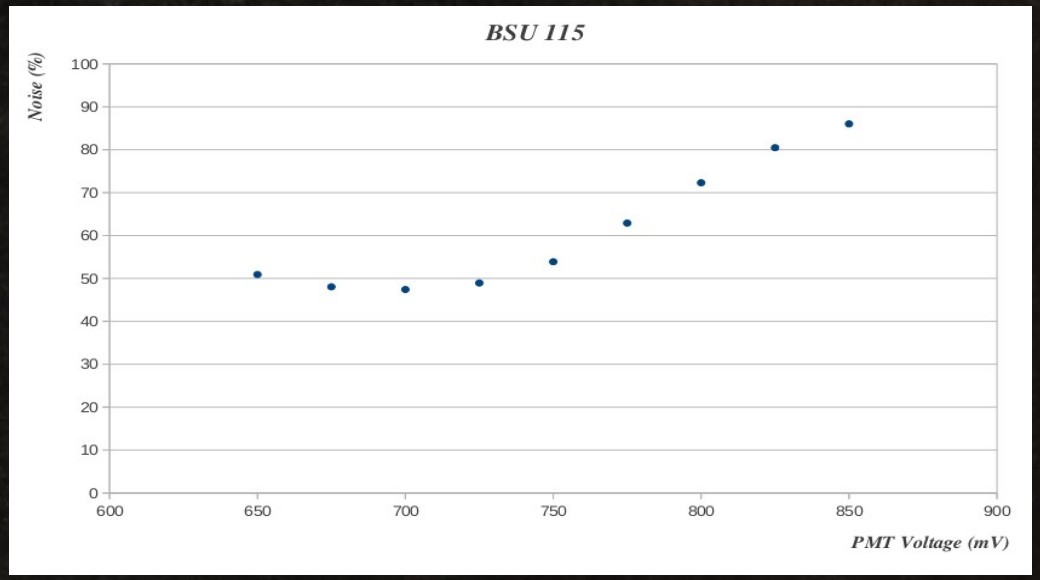
Test of efficiency vs voltage and position has been done replacing counters # 1 and #5 with two small counters positioned once on the left side and once on the right side of the counter column.

From the last update...



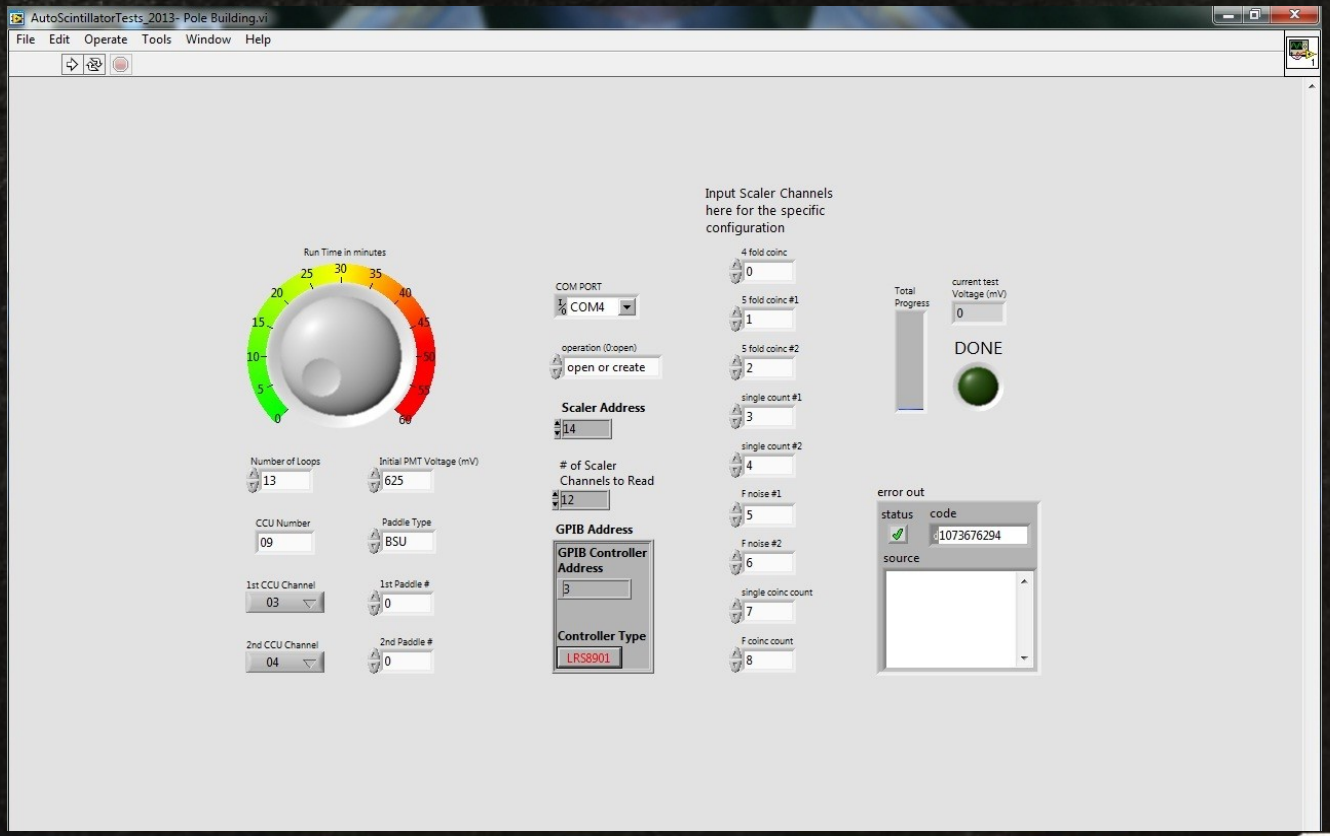
Counters are clearly more efficient in detecting events closer to the PMT. Nonetheless, the shape of the efficiency curve doesn't change dramatically with the event position. Hence, we can avoid to select the event position during our tests.

Currently, PMT working voltage is chosen so that the noise level falls in the 50% – 60% range and the efficiency in the 84% – 95% range. This can change when we'll find out how much the noise is reduced in pairs of counters.



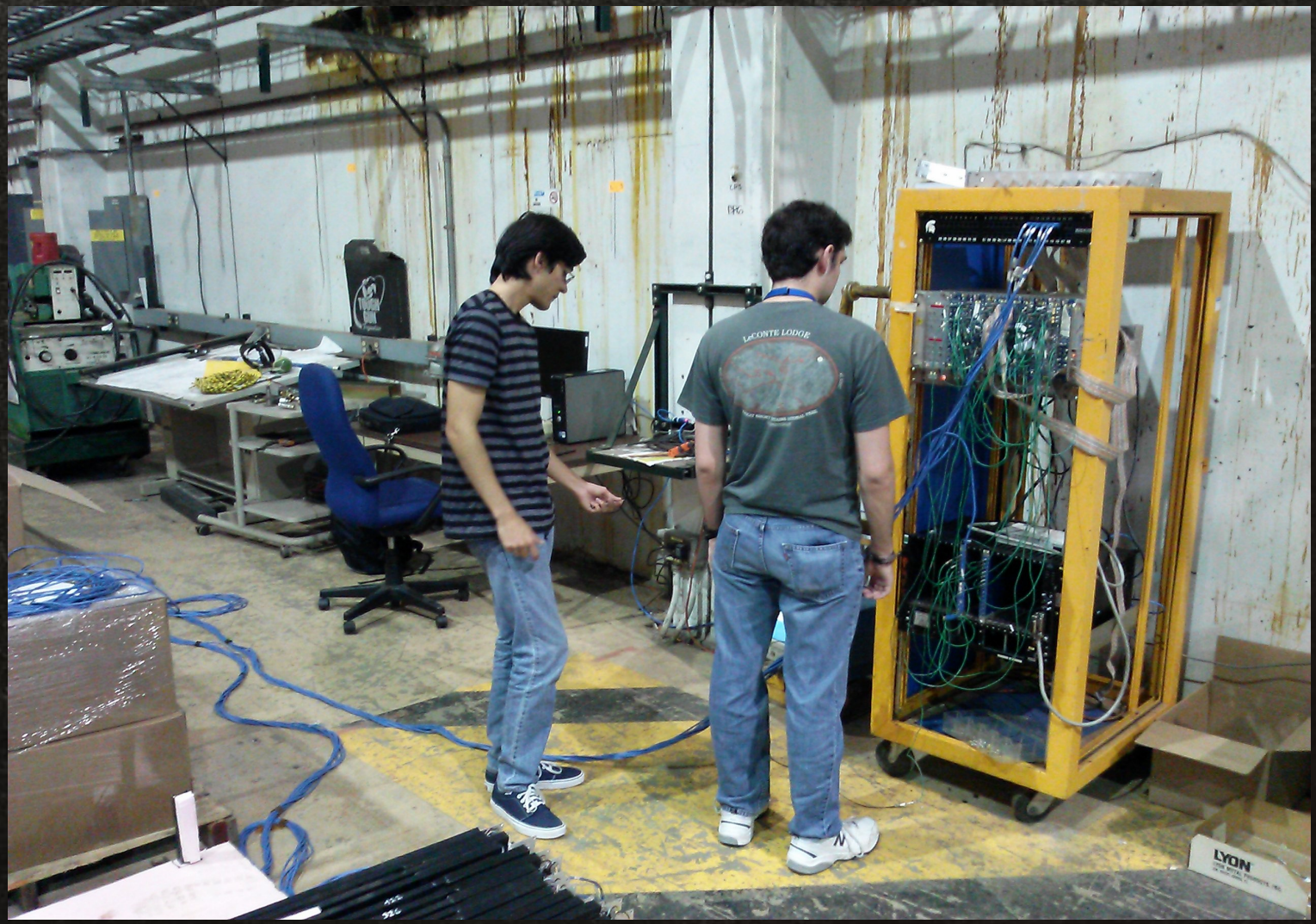
...to the new steps!

A first version of the Labview acquisition program is ready and is an .exe program. It simultaneously acquires efficiency and noise data as a function of the voltage for two different counters. The noise for the coincidence of the two counters is acquired as well. An upgrade of the program (and of the electronic) to simulaneously acquire data from three indipendent testing stations is currently undergoing.



...to the new steps!

Test set-up at Wideband is 99% complete. Once checked that everything is working correctly, we'll be ready to start testing counters there too.



...to the new steps!

Light leaks test on BSU counters are almost concluded. Over 70 counters have been tested. Slightly more than 50% of them had light leaks. At the same time, 23 PMTs have been mounted on BSU counters and we have 5 more PMTs to mount.

...to the new steps!

Last week we extracted from CDF all the BSU counters still on the detector and all the TSU counters (the ones needed for LArIAT Phase I) available...

...while someone had a free rock-climbing training!

The counters arrived yesterday at the Pole Building. TSU will be the first being tested (light leak, efficiency and noise) and before the end of the month we should start testing some trigger configurations to be implemented in LArIAT Phase I.

...and problems: PMT problem

✔ 2-3 weeks ago it came out that part of CDF PMTs actually belongs to INFN and should go back to them.

✔ For us, that translated into the possibility of not getting all the counters we asked for, and we risked to loose part of the TSU we need for the Phase I.

✔ To avoid this, we decided to both renounce to part of the spare BSU counters we wanted and to give back the 37 long (10 feet) CSP counters we already got for LArIAT Phase II (one layer of the muon telescope). As replacement to the CSP, we received from CDF 40 counters of the same dimensions but equipped with standard HV PMTs (currently stored at Wideband).

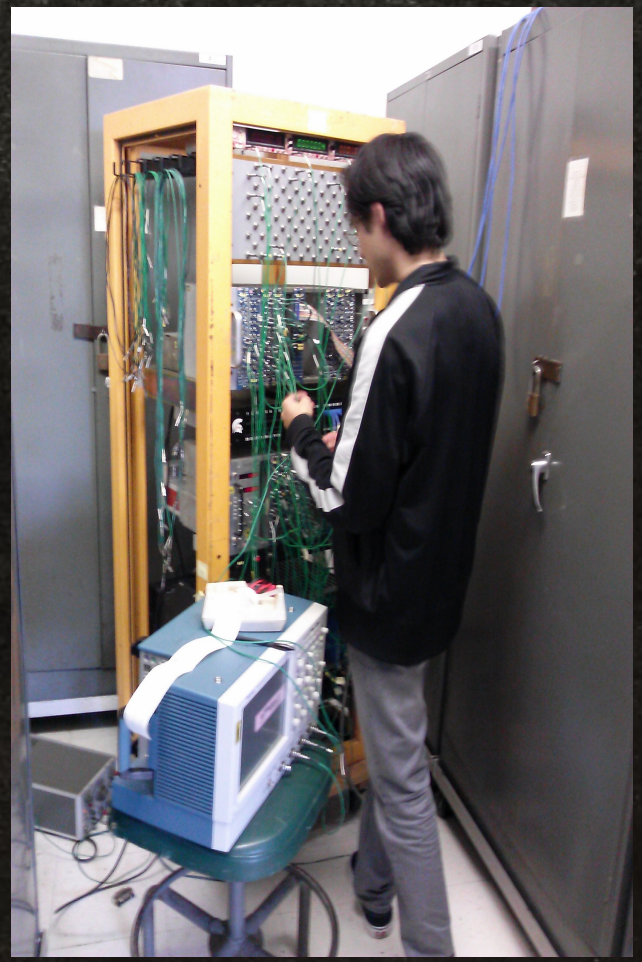
✔ As for now, we do have the counters we need for LArIAT Phase I. We should, but it is still not completely sure, have all the counters we need for LArIAT Phase II.

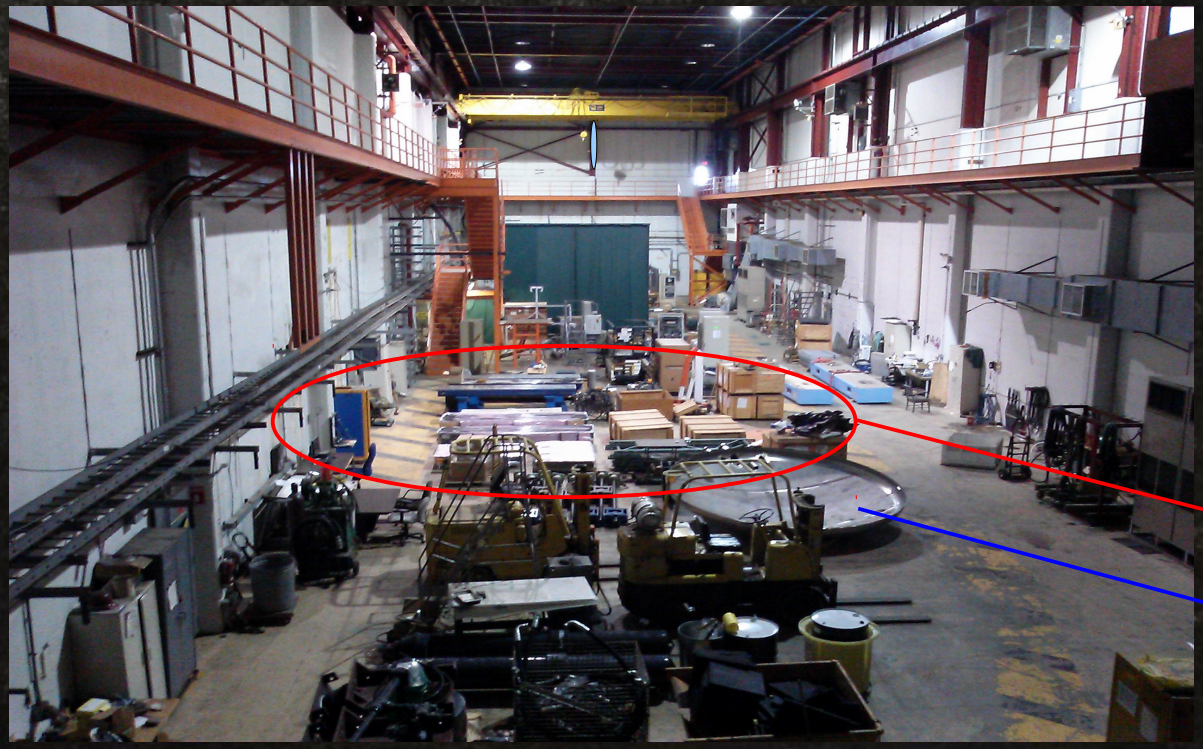
...and problems: CAMAC problem

- Yesterday the CAMAC controller borrowed from Alan in use at the Pole Building committed suicide. From yesterday we can't take data over there.

- This morning we found two modules of the same kind at PREP and we took them right before lunch. We will test them and hopefully everything will be back working as soon as today.

Random Pictures





Our area @ Wideband

Microboone snow sled